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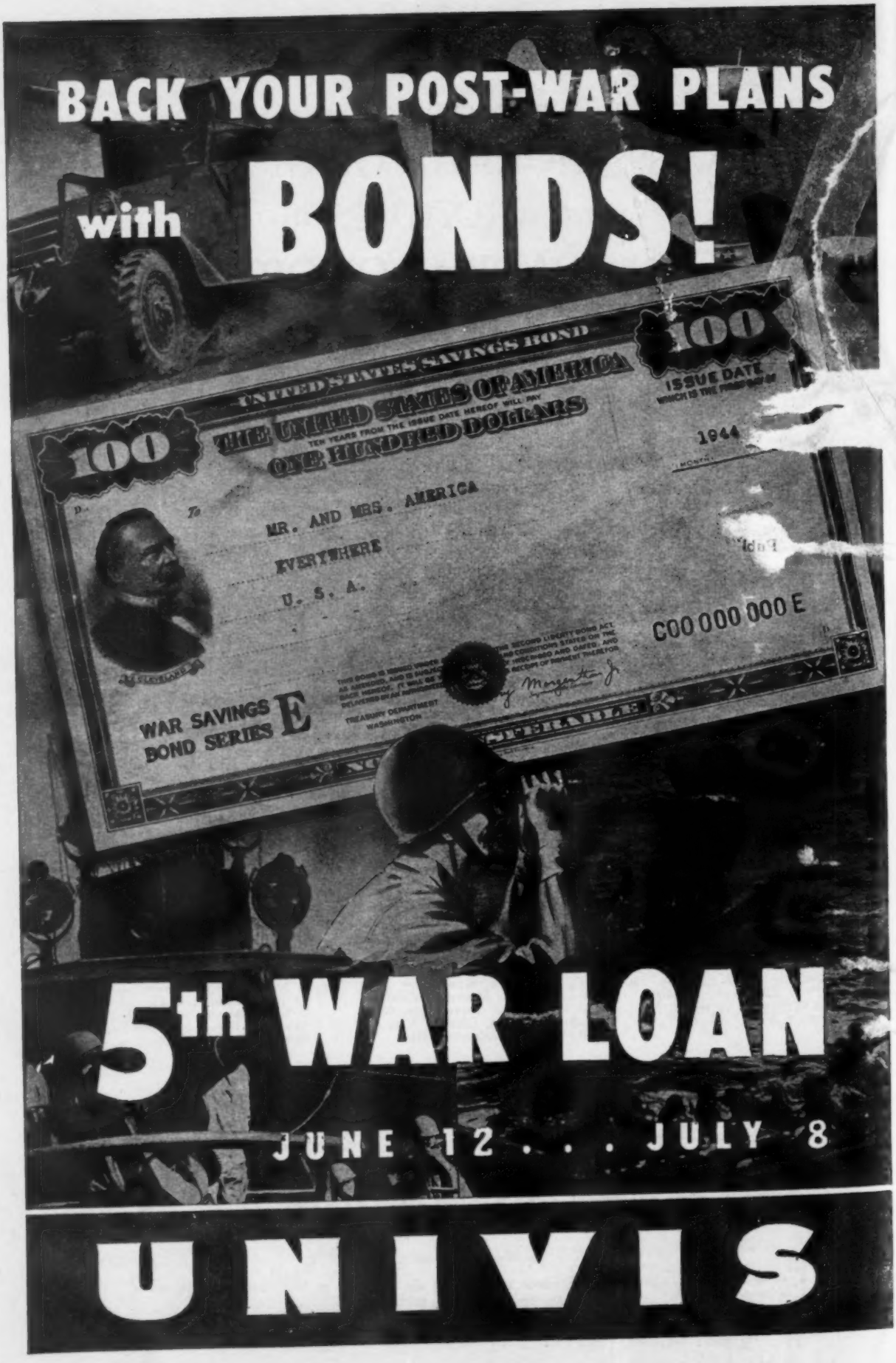
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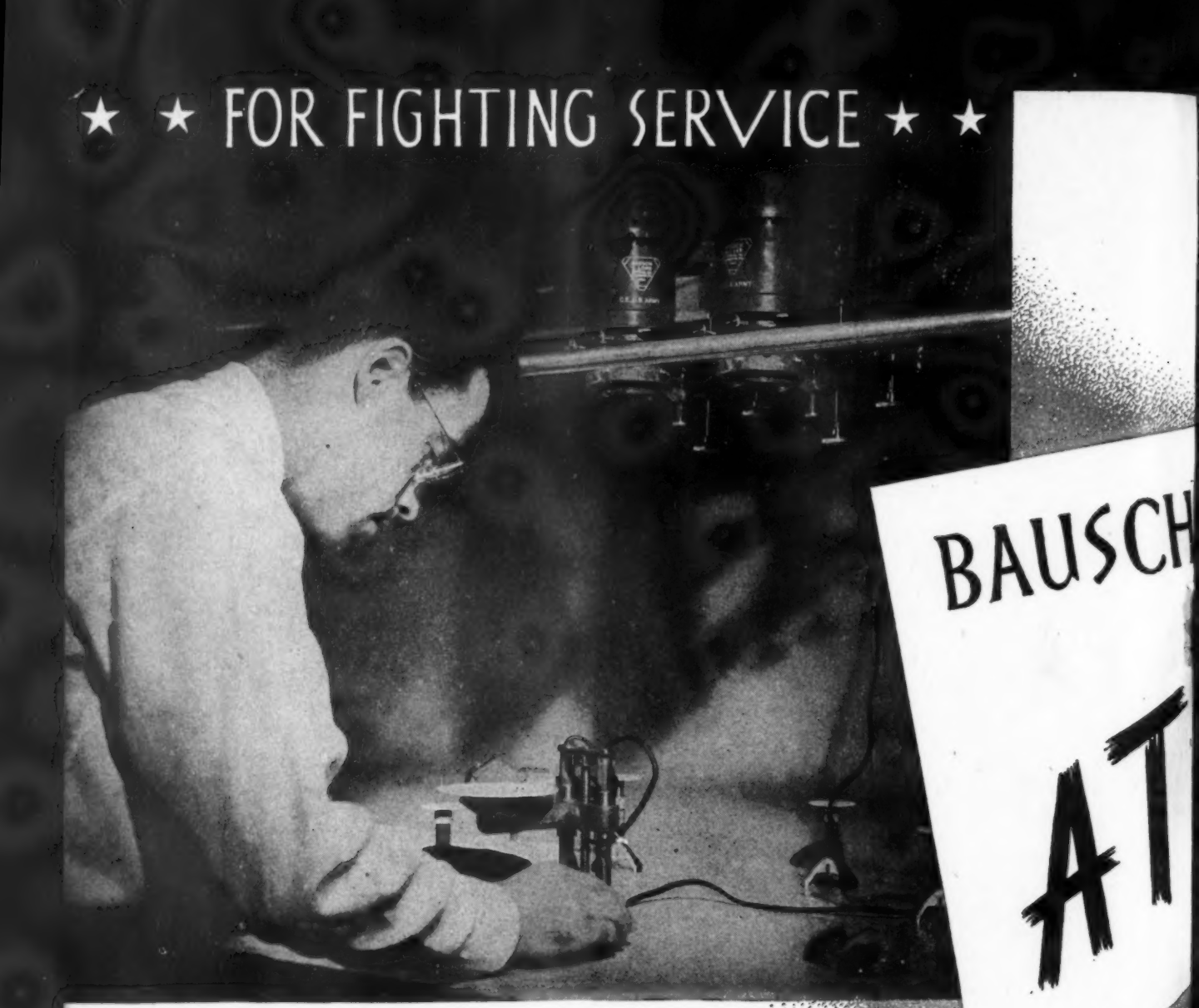

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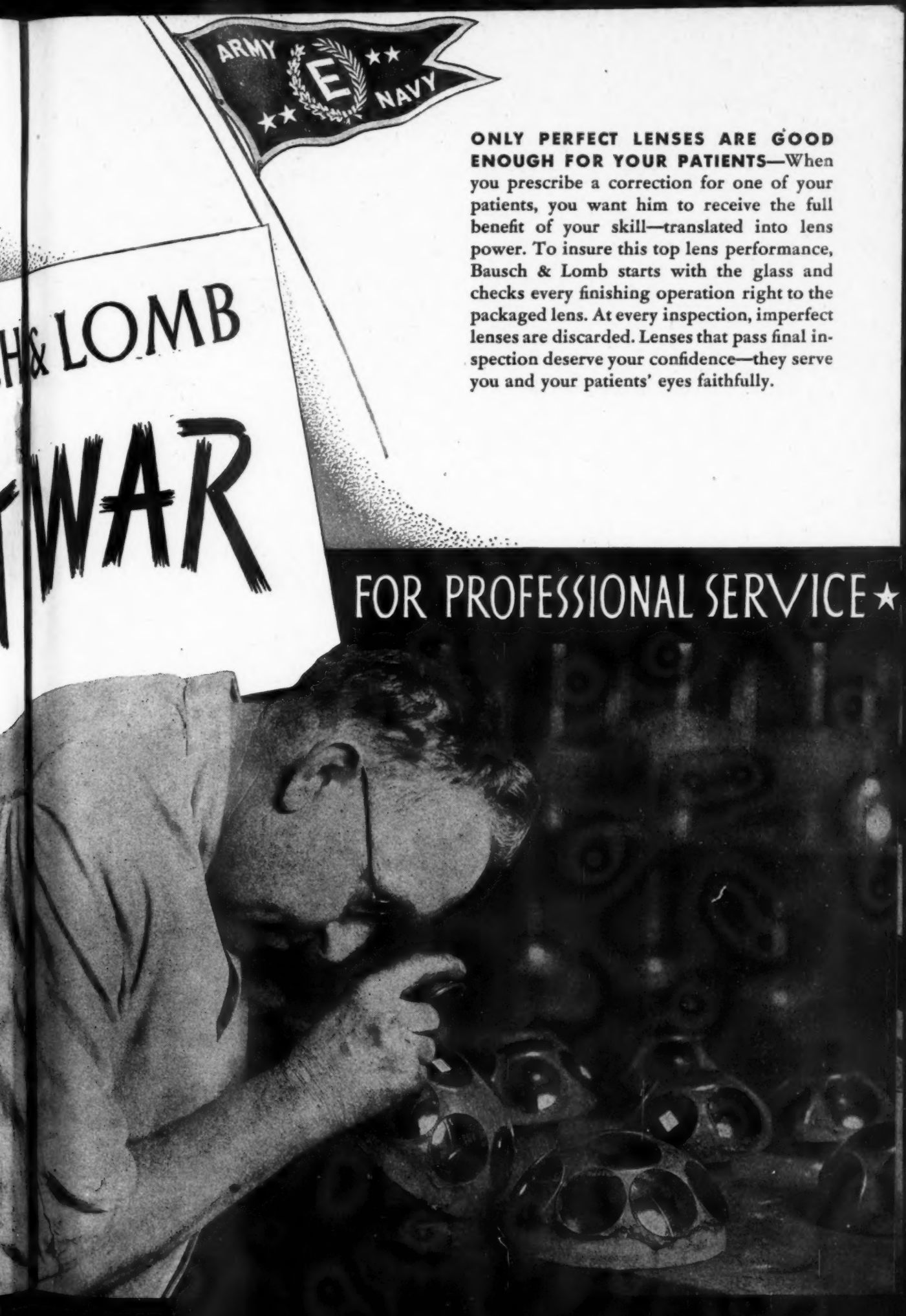

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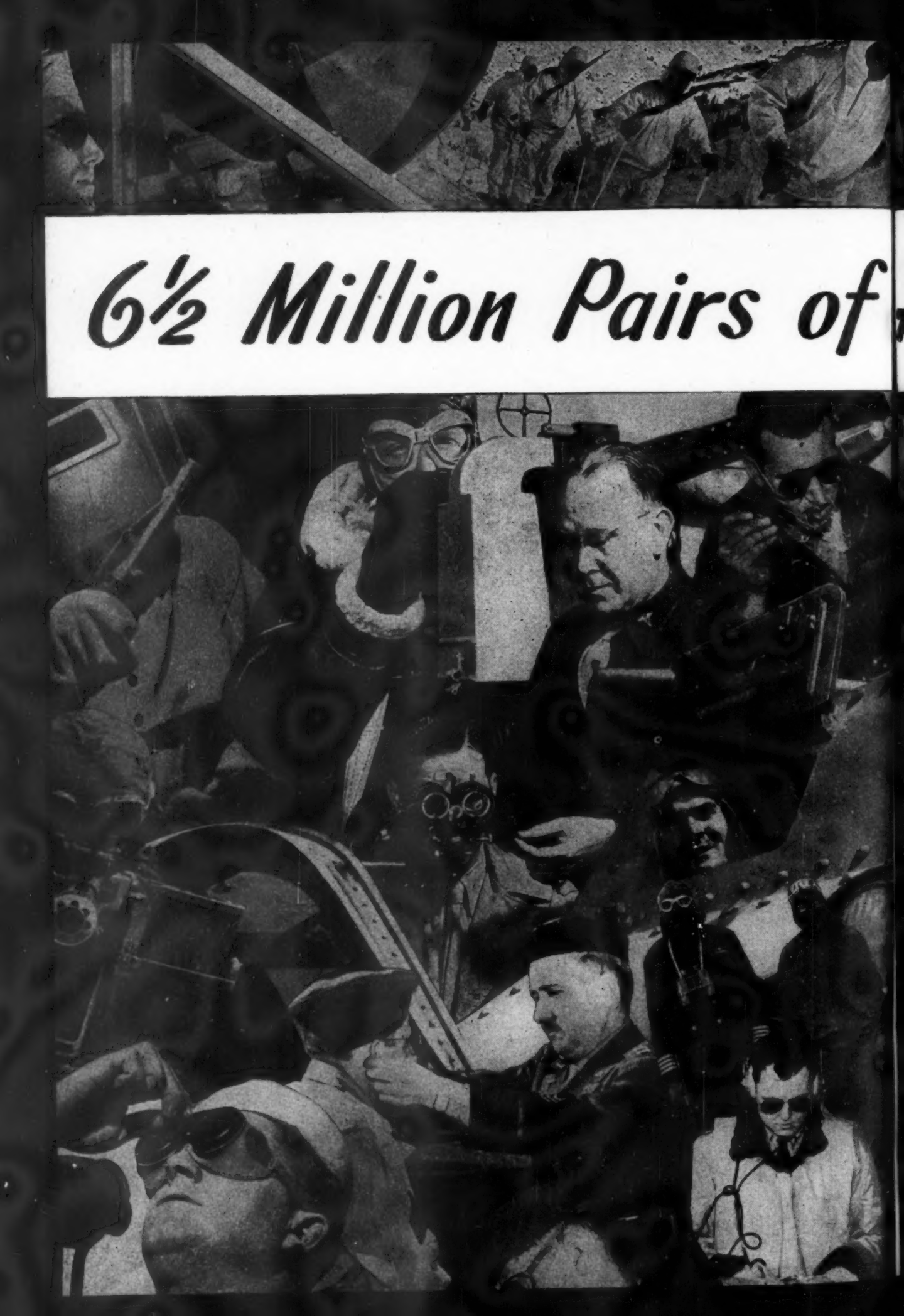
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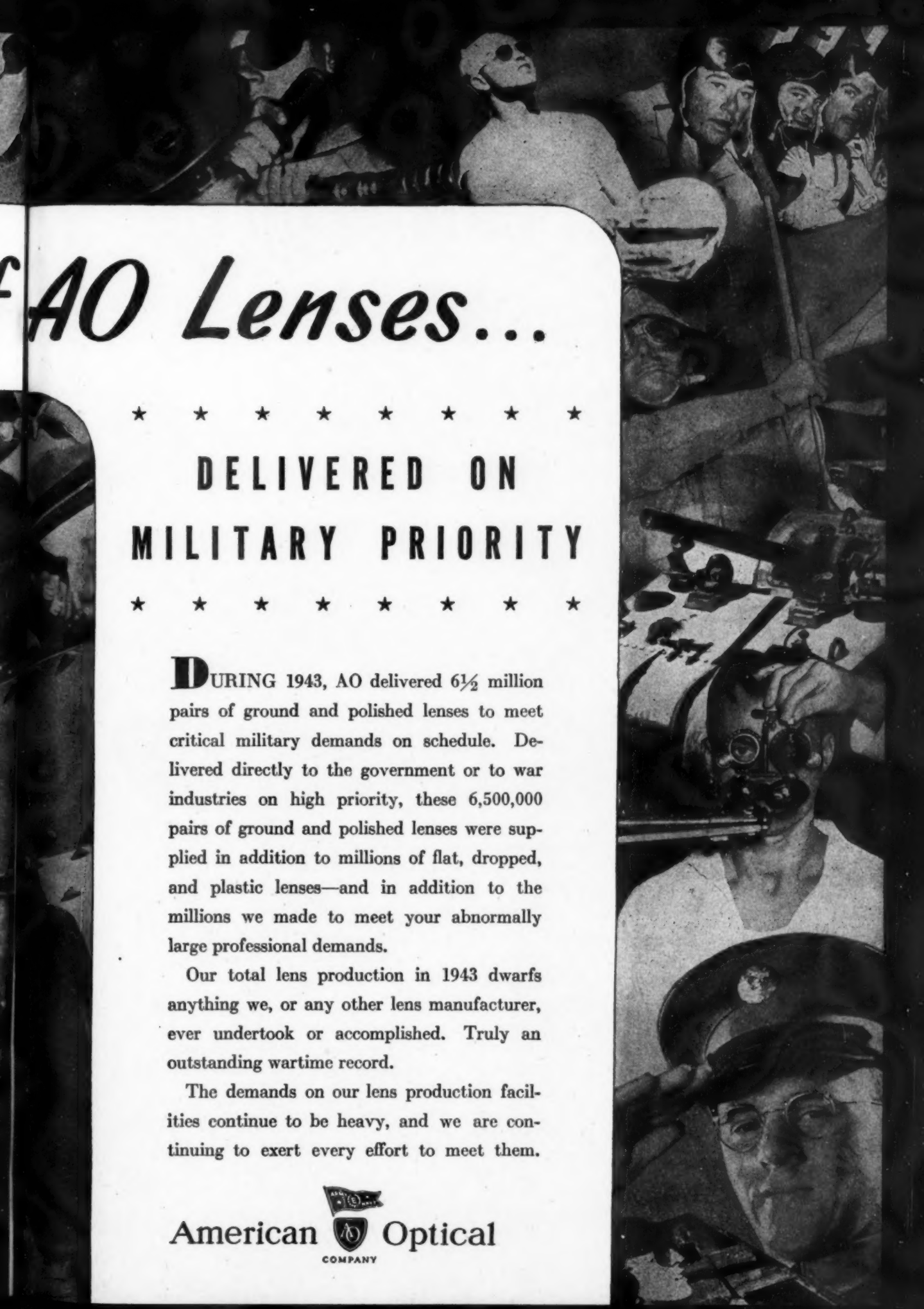

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ILLUMINATION INTENSITIES PREFERRED FOR READING WITH DIRECT LIGHTING*

Miles A. Tinker, Ph.D.
University of Minnesota

The ordinary reader does not hesitate to express a preference for what he considers to be an adequate light intensity for easy and comfortable reading. Preferences of this kind have been employed as supplementary data in prescribing foot-candle standards of illumination for visual work. Tinker (6) has questioned the validity of such practices.

A wide range of preferred intensities have been cited from experiments employing general illumination and favorable conditions of light distribution. Luckiesh, Taylor and Sinden (3) found that, on the average, readers preferred 5.3 foot-candles for reading large type (11 and 12 pt.) and 10.6 to 16.1 for medium sized type (9 pt.). When there was a low degree of contrast between 9 pt. type and the paper, the readers chose 17.4 foot-candles. In a later study, Luckiesh and Taylor (2), employing text in 9 pt. type, obtained preferences of 4.2 foot-candles when up to 8 foot-candles were available, 10.6 with 30 available, 16.1 with 45 available, 23.2 with 65 available, and 35.8 with 100 available. In more recent work Luckiesh and Moss (4) found an average choice of about 100 foot-candles when up to 1000 were available. Apparently visual adaptation was not controlled in any of these experiments. Perhaps the wide range in preferences is partly to be explained, therefore, in terms of visual adaptation at the time the choice is made. It is well known that the eye readily adapts to easy and efficient seeing at various intensities of illumination above a certain minimum (5). In fact, Tinker (6) has shown experimentally that the status of

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visual adaptation to the moment does determine to a large degree the intensity preferred for reading.

Little work has been done on preferences for illumination intensities chosen for reading under direct lighting, i.e., light coming directly from bulb of the fixture to the reading surface. In an unpublished paper, Aasen, Burwell and Harmon (1) report a preliminary study done in the writer's laboratory. To similate conditions found in many homes where light from floor lamps with open-faced shades are used for reading, a bank of light bulbs mounted on a standard was employed. An open-faced white cloth shade surrounded the fixture. The subject sat with the light coming over the right shoulder to the reading material placed on a stand. The light fixture was 40 inches from the reading stand. By means of a rotary switch operated by the reader, lighting of the lamps was controlled so that a range of intensities from 1 to 50 foot-candles was possible.

Fifty-three university students served as experimental readers. On entering the laboratory, each subject adapted for a period of 20 minutes to a general illumination of 4 foot-candles. Then the subject was asked to adjust the light, by moving the switch, to the brightness that he liked best for comfortable reading. The general illumination was turned off as the local lighting was turned on. At the end of a five-minute period of reading the light was readjusted. This was done for six successive periods. Readings of light intensity were taken by use of a Westinghouse Light Meter at the beginning of the first period and at the end of each of the six five-minute periods. A magazine printed in 9 point type, 2 point leading and in an 18 pica line width was used for reading material. The paper was moderately glossy.

Under condition A, approximately one-half of subjects started at one foot-candle and increased the intensity to the desired brightness. The other half, under condition B, started at 50 foot-candles and reduced the brightness by the desired amount. Twenty-two readers served under both conditions. The chief results are given in Table I.

Going from left to right in the table we find under condition A (beginning with low intensities) that the readers became stable in their choices on the average at the end of five minutes of reading. But when beginning with high intensities (condition B), the choices are fairly stable from the first. In other words, having been adapted to 4 foot-candles, the reader does not reach his final choice until he has read for

TABLE I

Illumination Intensities Preferred for Reading Under Direct Lighting
Average of Foot-Candles Chosen Each Period*

Number of Readers	1	2	3	4	5	6	7	Grand Average
CONDITION A: Light increased from low intensity								
22*	14.7	21.3	22.4	21.7	23.7	22.9	23.4	20.9
36	14.4	19.6	22.4	22.4	23.2	24.6	24.9	21.5
CONDITION B: Light decreased from high intensity								
22	28.4	27.1	27.7	27.3	27.6	27.2	27.0	27.5
39	29.2	27.2	29.5	27.9	28.3	28.6	28.7	28.9

*(1) In columns headed 1 to 7 are given average foot-candle readings at the beginning of first and at end of each succeeding five minute period.

(2) The 22 readers who read under both conditions A and B were included in the group of 36 and 39 readers.

a while under a somewhat brighter light. Furthermore, the grand average shows that under condition A, a less intense light (about 21 foot-candles) is chosen than for condition B (about 28 foot-candles). In view of the data cited above, it would seem that this difference is due largely to visual adaptation occurring during the experiment. Under condition A the reader is first exposed to less intense illumination and because of partial adaptation at these levels, tends to be satisfied with a less intense light than when he starts at the 50 foot-candle level and works down to his choice. Exactly the same trends appear for the 22 subjects common to conditions A and B as for the total group in which 14 and 17 readers observed only under one condition. In an intensive study of preferred intensities, each of three subjects observed in the same manner as the others but repeated the observations on each of five successive sittings one week apart. Trends were approximately the same as cited for the large group where one sitting was involved. The one exception to these trends was that, when starting with bright illumination, they chose somewhat greater intensities for reading during the first five-minute period than during successive periods at the same sitting. It may be concluded from these data that visual adaptation at time of choice determines to some degree the light intensity preferred for reading. And for this lighting situation, the illumination intensity preferred for comfortable reading was on the average between 20 and 30 foot-candles.

In the experiment just cited the illumination was not strictly localized on the reading table. Considerable light spread about the room due to the nature of the fixture. If one employs a light fixture which concentrates the major portion of the illumination in a limited area on the reading table, what intensities will be chosen for reading? Such a situa-

tion, because of poor distribution of the light, particularly with high intensities of illumination, is bad from the standpoint of hygiene of vision. The present experiment was devised to determine preferences for illumination intensities preferred for reading when the light is direct and strictly local.

The experiment was conducted in a light laboratory without windows. This permitted rigid control of the artificial illumination. Six standard, metal shade, flexible arm reading lamps equipped with regular frosted bulbs constituted the light sources. These desk lamps provided highly localized lighting. The fairly uniform spot of illumination on the reading stand was about 10 inches in diameter. From the perimeter of this area outward, the illumination decreased rapidly in intensity. Five watt to one-hundred watt bulbs were used, yielding illumination intensities of from 3 to 160 foot-candles.

A slanting reading stand, with the sensitive plate of a Westinghouse Light Meter inserted through a hole in its center, was placed upon a table. Text of the reading material was printed in 9 point type, 2 point leading in an 18 pica line width on moderately glossy paper. Each lamp, as it was used, was moved into a standard position beside the reading stand.

Thirty university students served as subjects. All had normal or adequately corrected vision. Each subject, on arrival at the laboratory, was adapted for 15 minutes to a general illumination of 3 foot-candles. This general illumination was turned off when work with the desk lamps began.

Near the end of the adaptation period directions were read to the subject: "We are attempting to discover the brightness of light which readers consider best for comfortable and efficient reading. We will start with the dimmest light and let you try each one for a few seconds up to the brightest one. Then starting again with the dimmest one, we will proceed upward until we come to the one which you prefer for easy and comfortable reading. You are to read for five minutes with the light you choose, at which time you may choose another light or keep the same one as your final choice."

Comfortable vision during reading was defined in terms of clear seeing of the print, absence of eye strain and absence of annoying glare. Illumination intensity (light meter reading) was recorded for the final choice made at the end of the five-minute period. Then the procedure

was repeated until five five-minute periods were completed and the five preferences were recorded for each subject.

The average of a subject's five choices constituted his preference score. These averages ranged from 10 to 84 foot-candles indicating a rather wide range of individual preferences. This trend is also revealed by the rather large relative variability of the scores. Averages and medians for each successive five-minute period of reading as well as the grand average were computed. The data are shown in Table II.

TABLE II

Illumination Intensities in Foot-Candles for Reading Under Localized Direct Lighting by 30 Readers

Measure	First 5 Minutes	Second 5 Minutes	Third 5 Minutes	Fourth 5 Minutes	Fifth 5 Minutes	All 5 Periods
Median	24.0	41.0	45.0	44.5	43.0	42.0
Average	31.7	38.2	50.1	46.6	46.4	42.6
Standard Deviation	20.0	16.1	33.6	20.8	20.3	17.4

The medians reveal the same trend as the averages. The fact that two of the averages are 5 to 8 foot-candles larger than the medians indicates the effect of a few extreme scores. It will be noted that the averages increase up to the third five-minute period and are approximately stable from there on. Due to the fact that the subjects were adapted initially to 3 foot-candles they were satisfied at first with moderate intensities for comfortable reading. As they worked with the brighter lights, visual adaptation changed and the tendency was to choose a somewhat brighter illumination for reading. This checks with the findings cited above. The grand average for all choices was 42.6 foot-candles which is approximately the same as the median (42 foot-candles).

It is difficult to compare these findings with others because of variations in experimental conditions. In general, under conditions where the reader is allowed to explore with considerable freedom over a wide range of intensities, it appears that he tends to choose a brighter illumination for reading under direct lighting than under general illumination (3, 1). When the direct illumination is strictly localized, as in this experiment, the tendency to prefer high intensities becomes much more pronounced. This is shown by comparing our average choice of approximately 42 foot-candles with the average of about 21 foot-candles obtained by Aasen, Burwell, and Harmon (1) in that part of their experiment where the reader explored from dim to brighter illumination. The higher intensities found in this experiment, however, may be partly due

to the greater range of intensities available to the readers. This permits visual adaptation to become more influential. Tinker (6) has demonstrated that this factor is important in studies of light preference.

The tendency for readers to choose relatively bright illumination for reading under localized direct lighting has unfortunate implications for the hygiene of vision. It has been shown that local direct lighting of the type employed in this experiment is unhygienic (5). The relatively small spot of bright light surrounded by dimly illuminated and shaded areas on the working surface furnishes a situation that rapidly produces visual fatigue. It is the lack of uniform illumination on the working surface that is unfortunate. As the intensity of the light is increased, the demarcation between the small bright area and the dimly illuminated areas becomes more pronounced and, from the viewpoint of hygienic vision, worse. In fact, subjects were much disturbed by variation in brightness of illumination from one region to another on the textual material read in the experiment—the Saturday Evening Post. To check on this complaint, foot-candle readings were made near the edges of the reading stand (which was same size as the page of the magazine) as well as in the center. As the illumination intensity was increased, the difference between foot-candles at the center and at the sides of stand increased. In the region of the average preference, 42 foot-candles, the intensity at the center of the page was 50 per cent greater than near the edges as compared with about 30 per cent difference at the 10 foot-candle level.

Literature on the subject points out that local lighting should be supplemented by general illumination to avoid an undesirable degree of brightness contrast on the working surface. This hygienic principle is unknown to many and frequently ignored by others. It is important, therefore, to point out that the undesirable features of such a situation are accentuated as the light intensity is increased. This further emphasizes that it is unsafe to follow individual preferences as to what seems to be the best brightness for comfortable reading with strictly local lighting. If such a light is used, relatively low intensities produce less visual fatigue.

In an investigation such as the one carried out here, it is difficult to control adequately changes in visual adaptation during the course of the experiment. Even though there is an initial adaptation to some specific light intensity, the adaptation is changed as the eye is exposed for varying amounts of time to other intensities. A further study should be

made in which visual adaptation is maintained close to a specific standard.

SUMMARY

1. A survey of the literature reveals a wide range of intensities of illumination chosen as best for comfortable reading under general lighting. Analysis of the data indicates that visual adaptation plays an important role in determining these preferences.
2. The purpose in this experiment was to determine illumination intensities preferred for reading under direct lighting that is strictly local.
3. The illumination used was derived from standard, metal shade, flexible arm reading desk lamps. Range of illumination available was from 3 to 160 foot-candles.
4. After a preliminary adaptation to 3 foot-candles, each of 30 readers chose the intensity he preferred for comfortable reading of text in medium sized type (9 point). Five choices were made.
5. Marked individual differences in preferred intensity of light were present, ranging from 10 to 84 foot-candles. Average for the group was 42.6 foot-candles.
6. There was evidence that changes in visual adaptation were affecting the choices.
7. Readers complained of uneven illumination on the reading page. Measurements revealed that increases in intensity accentuated this unevenness of the lighting.
8. Since, in this situation, bright intensities make a bad situation worse from the viewpoint of hygienic vision, preferences for illumination intensities for reading yield unsatisfactory data for prescribing lighting for the individual.

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A REVIEW OF THE WORK OF MORGAN, OLMSTED AND WATROUS ON THE SYMPATHETIC INNERVATION OF THE CILIARY MUSCLE*

A. Suisse, Jr.
Fort Wayne, Indiana

It will be recalled that the classical description of the innervation of the ciliary muscle of the eye is that the parasympathetic nervous system reaches it by way of the IIIrd cranial nerve, fibers of which have their nuclei of origin in the Edinger-Westfall nucleus in the midbrain, and terminate in the ciliary ganglion from which post-ganglionics go to the muscle. By innervation of these fibers the ciliary muscle is stimulated to contraction thereby increasing the curvature of the crystalline lens. Evidence is presented to the effect that in the cat, dog and rabbit, at least, stimulation of the superior cervical ganglion of the sympathetic nervous system appears to decrease the convexity of the lens as exhibited by an increase in hyperopia.

In 1939 Morgan and Olmsted working at the University of California Medical School, published the results of an experiment in which the eyes of 48 dark-skinned rabbits were refracted skiascopically under normal conditions and the results averaged. The animals were then put in a state of "excitement" by rubbing their noses. The average refractive error of the animals increased by approximately 1.00 D accompanied by a dilation of the pupils, the latter phenomenon long known to be the result of sympathetic stimulation. The animals returned to normal in an average of 2.5 minutes, during which time the return to the refraction to normal paralleled the return of the pupils to normal size. Homatropine was then applied and after waiting a suitable time for the drug to take effect (as evidenced by the abolition of the light reflex) the average refractive error was again determined and found to be approximately one diopter more in the excited stage than in the unexcited state. This suggests that since the sympathetics are known to produce dilation of the pupil, perhaps the increase in hyperopia is due to the sympathetics likewise.

Later, the human was used as the subject and the experiment repeated. They found that 37 out of 54 subjects showed a change in the skiascopic shadow on the application of an electric stimulus to the hand

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given suddenly by the observer. The stimulus was strong enough to be distinctly felt but not strong enough to cause distress. The procedure was to neutralize the eye with the minimum amount of plus that would give "against" motion. Following stimulation the motion changed from "against" to "with" but was of such short duration that measurement was not possible. Using the speed of the motion of the shadow as the criterion, however, the change in refraction was approximated as being about .25 D. In two subjects the return to normal was slow enough that a measurement of the altered refractive state was possible and was found to be .50 and .75 D. higher. The remaining 17 subjects showed the same response on application of a different stimulus such as a shrill siren, pistol, bell, etc. Such stimuli have likewise been known to cause dilation of the pupil which was accordingly observed. At the time of stimulation such known sympathetic manifestations as a change in skin resistance, increased heart rate, and decrease in foot volume were observed. Here again evidence is presented, this time in the human, that since a sudden stimulus is known to produce dilation of the pupil, which is effected by the sympathetic nervous system, the sympathetics may likewise cause the increase in hyperopia.

At this point they turned to the rabbit again as the experimental animal. The eyes of four rabbits were refracted skiascopically under normal conditions and found to average +3.08 D. Then under light anesthesia the left sympathetic nerve was stimulated and the left eye refracted. The average refractive state was found to be +4.17 D. This was done through an artificial pupil of 4 mm. diameter to annul possible errors that might result from the extremely increased pupillary size. The right eye of the rabbit was refracted at the same time as the left and found to average +3.10 D., the same refraction as was had without anesthesia. It is justifiable to interpret any increase of hyperopia of the left eye over the right eye as being due to the stimulation of the sympathetics because the right eye represents the state the left would have been in had it not been stimulated. The experiment was repeated on six more rabbits with similar results.

Utilizing the cat as the experimental animal another experiment was performed. Here the cat was refracted before ether anesthesia and found to be OU +1.00 D., and under light anesthesia the right eye was recorded at —.50 D. Stimulation of the left superior cervical ganglion caused a variation in refraction of between +4.00 and +6.00 D., i.e., the lens flattened and the eye became more hyperopic. The measure-

ment was made through an artificial pupil to annul the effects of the increased pupillary diameter. On opening the cranium and cutting the oculomotor as close to the brain as possible, there was mydriasis and a refraction of +3.50 D. Stimulation of the superior cervical gangloin with the IIIrd nerve cut, increased the refraction to +10.00 D. When the sympathetic nerve was cut the refraction returned to —.50 D. This experiment was repeated with other cats and dogs with similar results. This shows that stimulation of the sympathetics causes an increase in hyperopia with or without an intact oculomotor nerve.

Another cat was refracted under normal conditions and showed OU +1.50. Atropine was then instilled whereby the light reflex was abolished in one-half hour with which it was assumed that the parasympathetics were put out of commission. Stimulation of the superior cervical gangloin gave an increase in hyperopia of +1.00, i.e. the lens became flatter. The left superior cervical ganglion was then removed aseptically. One week later the refractive error was OD +2.00 OS +.50 showing that the eye with the cut sympathetic had become more myopic (i.e. the lens had become more convex). Stimulation of the IIIrd nerve gave an increase in myopia of —2.00 to —3.00 D. Thus it would seem that the sympathetic exerts a normal tonic control on the ciliary muscle.

It might be said that these results were due to pressure on the eyeball being exerted by the extra-ocular musculature although this would hardly be expected with a cut oculomotor nerve. To be sure, however, a rabbit was decorticated under ether so that a minimum anesthetic only would be needed in subsequent operations. Then all extra-ocular muscles were cut except the lateral rectus and retractor bulbi which were saved for support of the eye. Refraction then showed +2.50. The IIIrd nerve was then stimulated with which the eye became more myopic to the extent of +2.00, which was to be expected. The oculomotor was then cut and one hour later the reading was +3.00 D., presumably the increase in hyperopia being due to sympathetic action. The sympathetics were then stimulated and refraction went to +3.50 as expected (i.e. the lens became flatter). The experiment was repeated several times with the same results. Thus it would not seem that the results of sympathetic stimulation is dependent on any action of the extra-ocular musculature on the bulbus oculi.

As a result of this investigation there seems to be little doubt that at least in cats, dogs, and rabbits, stimulation of the superior cervical sympathetic ganglion increases hyperopia. This was originally claimed

by Jessop in 1888 and confirmed by Morat and Doyon in 1891, Terrien and Camus in 1902, Byrnes in 1933, and Cogan in 1937, but Trautvetter in 1866, Langley and Anderson in 1892, Romer and Dufour in 1902 failed to do so. Hess and Heine in 1898 found that stimulation of the sympathetic in dogs increased the hyperopia from +1.00 to +1.50 but they explained it as being due to the dilated pupil.

The workers recalled that Tait and Sinn in 1936 reported in a study on the effect of homatropine on the human eye that there was no effect on ciliary tone in 70 per cent of 150 eyes, that there was an increase in hyperopia in 21 per cent and a decrease in hyperopia in 9 per cent.

There seems to be strong evidence for the existence of BOTH a sympathetic and a parasympathetic control on the state of accommodation of the eyes of cats, dogs, and rabbits and that it is possible that this may be true in the case of the human also. The possibility that there exists in the eyes of patients reporting for visual examinations a mechanism whereby the parasympathetic nervous system through the oculomotor nerve may increase the refractive state of the eye and the sympathetic nervous system decrease the refractive state, seems to be a highly important point. It is hoped that this review will serve to stimulate interest in the subject sufficiently so that the true state of affairs may be known.

Summary and Conclusions

1. Stimulation of the superior cervical sympathetic ganglion leads to increased hyperopia (flattening of the lens), in cats, dogs, rabbits (human?) whether the eye is atropinized, the oculomotor nerve cut or intact, or whether the pressure effects by the extrinsic musculature is eliminated or not.
2. Sudden stimuli such as loud noises cause dilation of the pupil and increased hyperopia in man and rabbits.
3. Stimulation of the oculomotor nerve in rabbits and cats gives marked myopia whether the sympathetics are intact or cut.
4. "Accommodation of the eye for near and far vision presumably involved reciprocal action of the sympathetic and parasympathetic nervous systems."

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A NEW DIAGNOSTIC METHOD OF TESTING AND TRAINING COLOR PERCEPTION*

Israel Dvorine, O.D., F.A.A.O.
Baltimore, Md.

PART 1

In 1941, while making a routine visual analysis, which included a test for color-blindness, the author's attention was drawn to the fact that while the patient was unable to perceive the numbers on certain charts of the Ishihara group and therefore classified as red-blind, he had no difficulty in selecting a red card from a group of fifteen differently colored. Moreover, the patient stated that the red color gave him the least trouble and that he could recognize any shade of red. He was given an opportunity to do so and a number of interesting facts were disclosed.

It was found that he could select twenty shades of red from a group of 160 cards tinted by the author, but if a red card was placed alongside of a gray one of approximately the same intensity, he immediately became confused and uncertain. In addition to the red-gray confusion, it was discovered that he had similar trouble with blue-violet combinations. Subsequent tests with other patients who were positive according to the Ishihara, disclosed that many of them could select and name correctly individual colored cards but they became visually confused when these cards were lying adjacent to others of the same intensity. It was also noticed that all patients showed a gradual improvement in their perceptive ability when they were retested a number of times. The improvement in color perception was especially marked when the Ishihara numbers, which were previously invisible to them, were outlined with a dry brush.

After repeated tests and experiments, the author became convinced that present methods of testing color perception with the original and reproduced pseudo-isochromatic charts are (a) inadequate for a thorough analysis of color perception, (b) are frequently erroneous, and (c) classify patients as color-blind who are not color-blind but who are merely visually confused when they are required to discriminate between colors of approximately the same intensity.

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Inability to perceive the numbers on some of the Stilling-Ishihara plates is no proof that the patient is color-blind, for unknown neurological factors other than perception of colors are involved in these tests. Dunlap (1) found that only one of twelve "neurotic" individuals examined for color-blindness had normal color vision and he suggested the possibility "that a substantial proportion of those who are maladjusted are color-blind," but that the reverse is not necessarily true. Contour and configuration of the numbers which are made up of the dots may be important contributing factors. Lack of discriminatory ability for certain color combinations may produce a *background dominancy* which may interfere with the perception of the number on the chart.

The readiness with which patients learned to perceive the numbers previously invisible to them, also convinced the author that if a sound training method were devised, the perceptive ability of patients who fail in their initial test could be improved and thus enable thousands of young men now being rejected by the navy and air corps for "color-blindness" to serve their country in the branches of service where they are most needed.

PART 2

The diagnostic method of testing and training color perception designed by the author consists of two volumes of pseudo-isochromatic charts. Volume one is used for testing color perception and volume two for training. The testing charts provide a thorough analysis of the color sense and furnish information relative to the color nomenclature of the patient tested. In addition, the color combinations of these charts have been especially selected and arranged to provide a basis for training those who are found to have poor color perception.

The colors of the charts are based on the subtractive color theory; that is, that the primary colors are red, yellow and blue, and that all other hues are derived from a mixture of the three primary colors. Since the objective of a color perception test is to disclose if an individual has normal color vision, these charts are not limited to an investigation of the red-green and blue-yellow dificiencies, but are so arranged that at the conclusion of the test the examiner should have precise information regarding the individual's ability to perceive both primary and secondary colors. Moreover, each color has been superimposed on a background of primary and secondary colors, respectively, thus serving to select the

1. Science, November 26, 1943.

individuals who are not color-blind but who merely become visually confused by certain color combinations. These individuals are the ones who are classified as color-blind but who readily improve when given color perception training.

That many such cases exist is evident from the reports of "cures" and from clinical experience. In the June 5, 1943, issue, the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION stated that investigators were appointed to check on reports that individuals rejected by the navy and air corps because of color-blindness were later accepted, after receiving training in color perception. It was found, the Journal said, that these reports were correct and that men previously rejected were later accepted. In the opinion of the Journal, the training given these individuals was "educational" rather than "therapeutic."

A review of the literature devoted to the subjects of color-vision and color-blindness reveals that all theories so far advanced fail to explain one or more factors of color perception. The solution of this age-old problem may be close, now that evidence is accumulating in respect to susceptibility to training of the entire function of visual perception.

An individual may be totally or partially color-blind. In the former, he fails to see all the colors of the visible spectrum and therefore sees all the colored objects as gray or toneless; in the latter case, the individual sees some parts of the spectrum and therefore recognizes certain colors. Totally color-blind people are extremely rare and the defect is usually associated with some other visual anomaly or systemic disease. Incomplete color-blindness is frequently encountered, especially among men. It is estimated that there are from four to eight million color-blind people in the United States.

The term color-blind for the incomplete type is probably a misnomer, for it suggests that these individuals who have a defect in their color perception are unable to recognize certain colors when, as a matter of fact, the majority of them can recognize and name the colors correctly, except when they are superimposed or mixed with other colors. Thus, many individuals classified as red- or green-blind have no difficulty in recognizing these colors except when they are superimposed or lying adjacent to brown and orange, respectively. These cases of poor color perception should not be confused with color ignorance. In the latter case, the individual's color perception is normal but his color nomenclature is incorrect. If an individual can name and trace or outline

the numbers on all the Dvorine Color Perception Testing Charts he has normal color perception, although he may not be able to name correctly all the colors of the charts.

In volume one there are 60 colored testing charts and one rotating disk. The colors used are red, yellow, blue, orange, green, violet, brown and gray. The disk is tinted on both sides with the eight basic colors, the dark tints on one side and the light tints on the other. For obvious reasons the colors deliberately were not placed in their spectral sequence. The circular opening permits the exposure of one color at a time to prevent the person who is being tested from recognizing the color by contrasting it with another seen at the same time. The light tints usually confuse the patients who are not certain of color nomenclature.

The number on the first chart in the book is readily perceived by individuals with or without normal color perception. Its purpose is to acquaint the person tested with the fact that there is a number outlined within the pattern of the dots and that he must look for similar numbers on subsequent charts. Charts two, three and four are visible to patients who have normal color perception but induce varied responses from those who have a defective color sense. The charts are placed at the very beginning of the book to give immediate information regarding the visual perception of the person tested. Accurate responses, however, are no proof that color perception is normal for there are many persons who deliberately memorize the correct responses in order to fool the examiner. Incorrect responses should immediately lead the examiner to suspect that the individual has difficulty with his color perception. The few cases of positive malingerers that one meets occasionally can be easily recognized because they claim they cannot see even those charts that persons known to have defective color perception can see.

The number on the second chart is 95 and is visible to persons with normal color perception. Individuals who have difficulty to perceive red and green when combined with certain colors will report that there is no number on the chart or will hazard a guess which will become obvious immediately if they are asked to outline the number on the chart. Those who have difficulty with shades of green but who can see red under certain conditions, will report the number as 9; while those who have difficulty with the red but not with the green will see the number 5.

In a similar manner, individuals with normal color perception will see the number 26 of the third chart, while those who confuse red with gray will report the number as 6; and persons who confuse blue with

violet will say that the number is 2. The patients who have a weakness of perception for all four color combinations will claim that there is no number on the chart or they will imagine that they see a number from the grouping of dots in the background of the chart.

Persons having normal color perception will see the number 8 of the fourth chart, while those who cannot discriminate between green and orange colors will claim that the number is 3.

A detailed description of the 60 charts of volume one is given on the authors examination record sheet* which was designed for use with the Diagnostic Color Perception Testing Charts, and which accompanies the set.

At the conclusion of the test one of the four following situations will become evident:

(1) The individual's nomenclature is correct for all colors and he reports correctly all the numbers on the charts.

(2) His color nomenclature is correct but he fails to see the correct numbers on some charts.

(3) His nomenclature is incorrect for some colors but he reports correctly all the numbers on the charts.

(4) His nomenclature is incorrect for some colors and he fails to see the correct numbers on some charts.

In the first situation it is obvious that the person tested has a correct nomenclature for colors and that his color perception is normal.

In the second situation his color nomenclature is correct but his color perception is defective for some color combinations.

In the third situation the individual is color ignorant but his color perception is normal.

In the fourth situation the person is color ignorant and his perception is defective for some color combinations.

PART 3

The color perception training set (Volume 2) consists of four plates of graduated tints of the eight basic colors and 70 charts similar to the testing group. The training charts were designed to provide a means of contrasting one color against another by the simple process of varying the concentration of the dots in the background of the charts.

*The Examination Record Sheet for the Dvorine Diagnostic Color Perception Testing Chart is reproduced in full on pages 232, 233 and 234.

Thus, a patient who has difficulty in discriminating between red and green will readily see the red number on the green background (B1), because of the greater concentration of red dots contrasted against a lesser concentration of green dots. The recognition of the number is then made more difficult by a progressive increase in the concentration of the green dots (B2), until it is impossible to recognize the red number by contrasting its mass against that of the background, but must be recognized by its contrast in color only (B3 chart).

To facilitate the recognition of the numbers, cues have been placed in the upper left-hand corners of each chart of the training group. The upper row of dots indicates the color of the number and the lower row refers to the background. The charts that are printed in four tints have four rows of cues; the upper two rows indicate the colors of the number and the lower two the colors of the background.

The color combinations selected for training are *red and green, red and brown, red and gray, green and orange* and *blue and violet*. These color combinations were chosen because they more frequently confuse patients with poor color perception than any other combination of colors. Patients who have difficulty with other color combinations, in addition to these five, readily improve in their color perception after mastering the charts of this training set.

The following is a detailed description of the five groups of color combinations:

Red—Green

Chart Sequence	Colors on Chart	Number on chart	Chart Sequence	Colors on Chart	Number on chart
B 1	Rd & Gn	3	B 8	Rd & Gn	4
B 2	Rd & Gn	3	B 9	Rd & Gn	4
B 3	Rd & Gn	3	B 10	Rd & Gn	8
B 4	Rd & Gn	7	B 11	Rd & Gn	72
B 5	Rd & Gn	69	B 12	Gn & Rd	64
B 6	Gn & Rd	82	B 13	Rd & Gn	2
B 7	Rd & Gn	4	B 14	Rd & Gn	2

Red—Brown

Chart Sequence	Colors on Chart	Number on chart	Chart Sequence	Colors on Chart	Number on chart
B 15	Rd & Bn	8	B 22	Rd & Bn	9
B 16	Rd & Bn	8	B 23	Rd & Bn	9
B 17	Rd & Bn	8	B 24	Rd & Bn	6
B 18	Rd & Bn	5	B 25	Rd & Bn	23
B 19	Rd & Bn	22	B 26	Bn & Rd	57
B 20	Bn & Rd	96	B 27	Rd & Bn	7
B 21	Rd & Bn	9	B 28	Rd & Bn	7

Red—Gray

Chart Sequence	Colors on Chart	Number on chart	Chart Sequence	Colors on Chart	Number on chart
B 29	Rd & Gy	2	B 36	Rd & Gy	5
B 30	Rd & Gy	2	B 37	Rd & Gy	5
B 31	Rd & Gy	2	B 38	Rd & Gy	7
B 32	Rd & Gy	9	B 39	Rd & Gy	89
B 33	Rd & Gy	45	B 40	Gy & Rd	32
B 34	Gy & Rd	38	B 41	Rd & Gy	4
B 35	Rd & Gy	5	B 42	Rd & Gy	4

Green—Orange

Chart Sequence	Colors on Chart	Number on chart	Chart Sequence	Colors on Chart	Number on chart
B 43	Gn & Or	6	B 50	Gn & Or	2
B 44	Gn & Or	6	B 51	Gn & Or	2
B 45	Gn & Or	6	B 52	Gn & Or	5
B 46	Gn & Or	3	B 53	Gn & Or	93
B 47	Gn & Or	29	B 54	Or & Gn	86
B 48	Or & Gn	55	B 55	Gn & Or	9
B 49	Gn & Or	2	B 56	Gn & Or	9

Blue—Violet

Chart Sequence	Colors on Chart	Number on chart	Chart Sequence	Colors on Chart	Number on chart
B 57	Bl & Vt	5	B 64	Bl & Vt	4
B 58	Bl & Vt	5	B 65	Bl & Vt	4
B 59	Bl & Vt	5	B 66	Bl & Vt	2
B 60	Bl & Vt	8	B 67	Bl & Vt	50
B 61	Bl & Vt	63	B 68	Vt & Bl	73
B 62	Vt & Bl	97	B 69	Bl & Vt	8
B 63	Bl & Vt	4	B 70	Bl & Vt	8

The time required to train a patient who has difficulty with his color perception depends on the motivation of the patient, the extent of his difficulty and the frequency of the training periods. A patient who is anxious to improve will do so more readily than one who is not particularly interested. If his commission in the navy or air corps depends on his ability to pass a color perception test, his improvement is likely to be more rapid. Patients who have difficulty with only one combination of colors will make faster progress than those who have difficulty with all five groups. The frequency of the training sessions also governs the duration of the training. Daily training periods are advisable and twice a week would seem to be the minimum.

EXAMINATION RECORD

Name..... Date.....

Address..... Age.....

Nomenclature

Dark tints	Patient's response								
	Color on chart	Red	Green	Blue	Yellow	Brown	Orange	Violet	Gray
Light tints	Patient's response								

Color Perception

CHART SEQUENCE	COLORS ON CHART	NUMBER ON CHART	PATIENT'S RESPONSE	CHECK ERROR
A 1	Rd & Bl	48		
A 2	Rd & Bn Gn & Or	95		
A 3	Rd & Gy Bl & Vt	26		
A 4	Bl & Gn & Or	8		
A 5	Rd & Yw	49		
A 6	Yw & Rd	77		
A 7	Rd & Bl	53		
A 8	Bl & Rd	44		
A 9	Rd & Or	87		
A 10	Or & Rd	20		
A 11	Rd & Gn	67		
A 12	Gn & Rd	35		
A 13	Rd & Vt	29		
A 14	Vt & Rd	83		
A 15	Rd & Bn	5		

CHART SEQUENCE	COLORS ON CHART	NUMBER ON CHART	PATIENT'S RESPONSE	CHECK ERROR
A 16	Bn & Rd	92		
A 17	Rd & Gy	84		
A 18	Gy & Rd	59		
A 19	Yw & Bl	76		
A 20	Bl & Yw	60		
A 21	Yw & Or	3		
A 22	Or & Yw	74		
A 23	Yw & Gn	62		
A 24	Gn & Yw	99		
A 25	Yw & Vt	24		
A 26	Vt & Yw	7		
A 27	Yw & Bn	98		
A 28	Bn & Yw	37		
A 29	Yw & Gy	58		
A 30	Gy & Yw	2		
A 31	Bl & Or	46		
A 32	Or & Bl	70		
A 33	Bl & Gn	85		
A 34	Gn & Bl	38		
A 35	Bl & Vt	56		
A 36	Vt & Bl	39		
A 37	Bl & Bn	22		
A 38	Bn & Bl	80		
A 39	Bl & Gy	36		
A 40	Gy & Bl	52		

CHART SEQUENCE	COLORS ON CHART	NUMBER ON CHART	PATIENT'S RESPONSE	CHECK ERROR
A 41	Or & Gn	28		
A 42	Gn & Or	79		
A 43	Or & Vt	32		
A 44	Vt & Or	63		
A 45	Or & Bn	47		
A 46	Bn & Or	96		
A 47	Or & Gy	4		
A 48	Gy & Or	50		
A 49	Gn & Vt	25		
A 50	Vt & Gn	93		
A 51	Gn & Bn	69		
A 52	Bn & Gn	33		
A 53	Gn & Gy	68		
A 54	Gy & Gn	57		
A 55	Vt & Bn	23		
A 56	Bn & Vt	40		
A 57	Vt & Gy	54		
A 58	Gy & Vt	9		
A 59	Bn & Gy	88		
A 60	Gy & Bn	65		

TYPE 1
- ☐ Nomenclature correct
- ☐ Color perception normal

TYPE 3
- ☐ Nomenclature incorrect
- ☐ Color perception normal

TYPE 2
- ☐ Nomenclature correct
- ☐ Color perception defective

TYPE 4
- ☐ Nomenclature incorrect
- ☐ Color perception defective

DIAGNOSIS:

SUMMARY

A new and improved diagnostic method of testing color perception has been presented.

Many patients, who formerly have been diagnosed as being color-blind, have been found by this method to lack discriminatory ability for certain color combinations of approximately the same intensity.

It is probable that real color-blindness is much rarer than is commonly suspected, and that a far greater number have various degrees of difficulty in color discrimination.

The five groups of color combinations which are confused more frequently were described as: red-green, red-brown, red-gray, green-orange and blue-violet.

Retesting patients a number of times disclosed a gradual improvement in their perception of numbers which were previously invisible to them on the pseudo-isochromatic charts.

A new method of training individuals lacking discriminatory ability for certain color combinations has been described for the first time.

ISRAEL DVORINE, O.D.
2328 EUTAW PLACE,
BALTIMORE, MD.

NOTES ON THE MANUFACTURE OF SPECTACLE FRAMES DURING A WAR PERIOD IN THE UNITED STATES*

J. E. Hansen†
Washington, D. C.

Will the production of spectacle frames improve and larger deliveries result—or are the prospects not so good? This is a logical question and in attempting to answer it I must first point out that in this war period the manufacturers have had some very difficult problems to solve. In general the situation can be summarized as follows. Back in the early part of 1941, before Pearl Harbor and preparatory to active participation in the actual fighting to come, the Office of Production Management—now W.P.B.—had but one viewpoint. This was that all materials, all productive capacity was measured by one yardstick only. "What part did or could it play in defense?" The word "essential" was predominating and by that was meant "combat duty." The fact that an item might be a contributing factor did not count. So when we started talking about making spectacle frames we were met with such answers as, "There are enough glasses in the country to last for years," or "Everyone has two or three spare pairs lying around the house."

The problem was finally solved by the industry working out a plan whereby we asked for enough material to meet our exact requirements to be apportioned out to us on a monthly basis—showing how the material could be made to flow through the many channels involved before it finally reached the hands of the manufacturer. We didn't say we want nickel; we said we want just so much nickel, which is only sufficient to make the number of frames manufactured by the industry in 1940. In effect, the plan called for allocation of materials. This was not easy, because allocations were then in the conversational stage and there was no machinery for administering the plan. So we set up our own machinery and did our own administering through the cooperation of the nickel company, the producers and the platers. Because of that arrangement, which worked so smoothly for us, the industry was left more or less free and unhampered by restrictive and limitation orders.

Because of that and the continuous study made by the Technical

*An abridgement of the material "The Frame Situation," presented before the Optical Wholesalers National Association, annual meeting at Detroit, Michigan, December 10, 1943. Submitted for publication by Mr. Guy Henry, Secretary of the Association, on March 3, 1944, for publication in the June, 1944, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

†Co-Chairman, Material Procurement and Technical Committee of the Optical Manufacturers' Association.

Committee in conjunction with leading metallurgists, research engineers and scientists well versed in the problems of conservation and substitutions, the public has been served with a product very little different from that which it has always had. Please remember—we had just so much nickel to work with. We were faced with the problem of making that nickel go just as far as possible. If we chose to make our product out of pure nickel, obviously we couldn't make as many frames as we could if we reduced the nickel content to 10%.

We knew also that the use of spectacles had suddenly been advanced a full ten years. Youngsters who had never used glasses before discovered they needed them because of eye strain due to long hours and poor lighting conditions. Older people finding themselves in different lines of work discovered their eyes were not as good as they had believed. These changes in the daily lives of the nation's workers were rapidly creating an unprecedented demand which had to be satisfied. It amply justified the position taken so early in the fight by the industry that not only were spectacles essential—without them production figures would suffer tremendously. The manufacturers foresaw this problem and took the necessary steps to solve it. Sales each year since 1940, measured in dollars volume, have shown substantial increases. Consider, also, that 1940 has been the barometer year. All civilian requirements were based on it. All industry, generally speaking, if permitted to continue making civilian goods at all, have been cut back under 1940. The optical industry —and it is the only one that I know of—has been permitted to go ahead of the 1940 figures.

You hear a great deal about the easing of materials for civilian production. Some little easing is taking place, more will follow, but it is reasonable to suppose this easing will follow the lines of gradual elimination of nuisance orders which limit the length of your shirt, no pleats in the trousers, the length of the blade in your knife, etc. There is still a shortage of the basic materials used by the optical industry—namely—nickel, tin and copper. Don't think you are going back to prewar materials overnight. It just won't happen that way. Control of materials by the government, will, in all likelihood, be maintained for some time after cessation of hostilities. So what about the future?

Without delving too deeply into details, I have tried to show that the optical industry has had some major problems to overcome during the past three years. I think you will agree these problems have been solved in a manner justifying to the utmost the confidence reposed in us by the many government agencies affected and involved in making the

final decision. Not only have the manufacturers contributed willingly and generously in the fulfillment of all optical requirements for the Armed Forces, but the civilian user has not been made to suffer.

There will be other problems to solve in the months to come—many of them. And production problems, too. We are in the throes of them now—but they are not insurmountable. And it is not always materials—sometimes it is the matter of facilities—sometimes equipment —sometimes manpower. There is an answer to all of them and we are finding them.

At the present time we are faced with the problem of using a combination of materials we have never used before, except in an experimental manner. You probably know that in midsummer a limitation order was issued prescribing exactly how certain materials were to be used. Through the medium of appeal, the manufacturers gained several months respite by getting permission to use such materials as were in their inventories or were in the hands of the platers, earmarked for them. That gave us the time needed to complete our studies and our plans for the use of the materials indicated in L-214. Possibly you have had frames made according to this limitation order, but if you haven't, you surely are going to get them within the very near future. This compromise was arrived at only after the Technical Committee of the Optical Manufacturers' Association had made exhaustive studies and tests with every type of material that could possibly be used in the manufacture of metal and zyl frames.

And now as to 1944 and the future. Do not have any qualms or misgivings about the product you will be getting—whether it be made from pure nickel, inconel, 18% nickel, 10% nickel silver, optical metal, steel or a combination of all or many. The manufacturers, with their technical staff, have studied the use of these materials. They know exactly what they can do with them and they know the resultant product to be obtained from their use. Naturally, each manufacturer solves his problem according to his own standard of excellence. When they put their name on that product, it becomes their responsibility as well as yours. Their reputation is behind it, backed by years of engineering skill and production experience. In my opinion, the optical industry is making, and will continue to make a product—even under war conditions—that will fully measure up to the high standard of perfection so well established over the past decade.

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Publication Office: 1501-04 Foshay Tower, 821 Marquette Av., Minneapolis 2, Minn.
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TRIFOCALS

Glasses, to clear the vision of patients over forty-five years of age for near vision, have been used for many centuries. Benjamin Franklin first conceived the bifocal which combined into one lens both a distance and a reading glass. During the past quarter of a century, several types of triple focus lenses have been developed which correct the eye of the middleaged for vision at arms length in addition to the two visions found in the bifocal. Notwithstanding the excellence of these trifocal lenses, they have not been used very extensively and many wearers of bifocals have never heard of them.

There are several reasons why we have not made more frequent use of the trifocal. Perhaps the most important reason for the failure to prescribe the trifocal more often is the fear of any lens more complex than the bifocal. Before an optometrist can prescribe for an eyestrain arising from the lack of an adequate correction for vision at arms length, he must deal with the fear which arises in part from the lack of familiarity with the trifocal. The difficulties in prescribing trifocals are not associated with the measurement of the error or the determination of the proper lens power. The obstacles are psychological and are found chiefly in the mental attitude of the patient toward the wearing of trifocals, so the problem of prescribing trifocals is in reality the problem of adjusting the thinking of the patient with respect to the correction of poor vision at arms length due to age.

The optometrist must bear in mind that this is the first time the patient has experienced the particular difficulties associated with vision at arms length. He is able to judge the future only in the light of past experience. In previous years when vision blurred or his eyes became tired with eyestrain, a pair of bifocals eliminated the ocular distress. It is difficult for the patient to understand why a bifocal will not now satisfy his need. When he first encountered the eyestrain due to age he accepted the idea of bifocals without understanding the physiology involved because society had accepted the wearing of bifocals as the proper procedure for those over forty years of age.

When the patient encounters for the first time in his life an eyestrain which does not respond to bifocals, there is no accepted precedent, as in the case of bifocals, which would make him receptive to the idea of trifocals. Since society is relatively uninformed about trifocals, it is frequently necessary to trace for the patient the continuity of physiological change in the focusing mechanism of the eye which requires the transfer from the bifocal to the trifocal type of lens.

It may be necessary to tell the patient that the lens of the eye which focuses clear pictures on his retina must be transparent, therefore it cannot have blood vessels to nourish the lens substance. The lens is bathed on the outside with the fluid element from the blood stream and, obviously, those cells in the center are not as well nourished as those on the surface. Hence, the cells in the center are undernourished and therefore become hard. The lens in its original state was a soft jelly-like substance which could be easily distorted into the proper shape to focus the rays of light from a near object by the ciliary muscle, but, as the patient grows

older, the central hard area becomes larger and larger thus making it more and more difficult for the eye muscles to focus for close work. Sometime in the early forties the lens becomes so hard that it is difficult for the delicate internal eye muscle to change the shape of the lens sufficiently to create clear vision at sixteen inches. But the hard center of the lens continues to become larger until the patient no longer is able to see fine detail clearly at a distance of twenty-four inches through the upper part of a bifocal lens. The development of this area of indistinct vision at arms length occurs in patients about fifty years of age.

It is peculiar that those patients who suffer the most from eyestrain because of the lack of a third focus are frequently most positive that they can see at arms length. They are not conscious of the slight blur on a large object at arms length. Only when the patient wears a correction for arms length vision does he begin to realize that the strain arising from an eye only slightly out of focus may be excessive in comparison with the slight amount of blur.

The following demonstration will convince the patient that he does have blurred vision at arms length and that it takes a third additional focus to clear the blur. We ask the patient to stand two feet away from a diploma on the wall and to read the fine print. We ask him to read it through his lens above the bifocal. He cannot do it. We then ask him to read it through the bifocal. Again he cannot do it. We then hold up before his eyes the lens required to focus vision for twenty-four inches and ask him to read the fine print above the bifocal. He is surprised by the clearness of the fine print.

We then ask the patient to turn and read the chart at twenty feet with this extra lens. He finds that the lens which made clear vision for twenty-four inches blurs at twenty feet. Likewise, he discovered that the same lens will not give satisfactory vision for close reading. We then remove the extra lens and he has clear vision both for distance and reading with his bifocal.

We have demonstrated to the patient that at his age he can no longer see fine print clearly at twenty-four inches through either the upper or the lower part of a good bifocal and that in order to see fine detail clearly at arms length, he must have a third or intermediate focus. Furthermore, we have explaind to him the physiology involved and helped him to understand that the wearing of trifocals is occasioned by the continued progress of the same lens changes that first required the

use of bifocals. In most cases this is sufficient to adjust the thinking of the patient so that the idea of trifocals holds no fear.

The next step is to ascertain if the vocational or recreational activities of the patient involve sufficient use of the eyes at twenty-four inches to necessitate a third focus to relieve eye-strain. The card player, the piano player, the operator of a bookkeeping machine, the executive who studies closely the facial reactions of the man across his desk, the foreman who must closely examine something over the shoulder of a workman, the clerk who must read fine print upon a box on a shelf above eye level, the housewife who wishes to see the texture of material in a show case and also the conversationalist who concentrates his attention on the face of his listener will find in the trifocal comfortable vision that no longer can be obtained with the usual bifocal fitted for sixteen inches.

It has been a not infrequent experience to find a patient wearing a pair of bifocals which were satisfactorily adjusted for both distance and reading and notwithstanding the patient complained of eyestrain which was relieved only when he began to wear a trifocal lens. With the passing of time and the acceptance of the trifocal by society, it is not inconceivable that at some not too distant time in the postwar era the public will take for granted that a person begins the wearing of trifocals in the early fifties just as one begins to wear bifocals in the early forties.

The responsibility for recognition of the patient who is suffering from the strain of vision at arms length through a bifocal is both a challenge and an opportunity to render a useful service to society. Optometry, in cooperation with other elements in the ophthalmic professions, is meeting this challenge. As we continue to adjust the thinking of our patients toward trifocals and restore to the older patients the keenness of vision for fine detail at twenty-four to thirty-six inches, we are defeating age and giving to the aged eye the best substitute science has yet devised for the absence of youth.

C. W. MORRIS.

THE CRITERIA OF A PROFESSION

The following reflections come from Byrne J. Horton, Graduate Faculty, St. John's University. Contemplating the characteristics of the professions of law, medicine, theology, and advanced teaching, Dr. Horton advances ten criteria or earmarks of a genuine profession.

1. A profession must satisfy an indispensable social need and be based upon well established and socially accepted scientific principles.

2. It must demand an adequate pre-professional and cultural training. (Today, a two-year college course is generally required.)

3. It must demand the possession of a body of specialized and systematized knowledge.

4. It must give evidence of skills which the general public does not possess; that is, skills which are partly native and partly acquired.

5. It must have developed a scientific technique which is the result of tested experience.

6. It must require the exercise of discretion and judgment as to the time and manner of the performance of duty. This is in contrast to the kind of work which is subject to immediate direction and supervision.

7. It must be a type of beneficial work, the result of which is not subject to standardization in terms of unit performance or time element.

8. It must have a group consciousness designed to extend scientific knowledge in technical language.

9. It must have sufficient self-impelling power to retain its members throughout life. It must not be used as a mere stepping-stone to other occupations.

10. It must recognize its obligations to society by insisting that its members live up to an established and accepted code of ethics!

ARTHUR P. WHEELOCK.

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

by J. Fred Andreae, Secretary

A department devoted to announcements, reports, appointments, organization data, news professional problems and ideals, as these relate to the Academy.

IMPROVED METHODS OF PRACTICE

More than two decades ago a few optometrists visualized present day conditions unless optometry be practiced as a profession in a professional environment. These few have continued unceasingly to urge the elimination of optometric practice in stores, window displays and outside display signs. While there are many now (in contrast to twenty years ago) who do practice ethically and professionally, they are few

when compared to those who still maintain practices in commercial environments.

When the present war started and our optometrists entered the service, the optometric world was brought to a sudden realization that the optometrist had no professional standing in the eyes of the War Department, regardless of his professional training. True, his services as an optometrist are being used, but without the benefit of rank bestowed upon other professions. He is not allowed to stand on his own feet as his findings must have the approval of a medical officer, even though many times this officer has but a superficial knowledge of refractive conditions. When this state of affairs was brought to the attention of the American Optometric Association they immediately began the program with which we are all familiar, but which, unfortunately, was many years belated. Now when the War Department is contacted it informs us we cannot hope to claim professional recognition because of those optometrists who practice optometry in stores on the business streets. Thus recognition is hopeless until this commercial practice ceases.

So much for existing conditions, for regardless of whether the War Department does or does not grant optometry recognition we are faced with the problem of our very existence after the war is over.

This problem can be solved virtually overnight by the optometrists themselves. First, optometrists who practice for themselves can remove all outside signs, place venetian blinds in their store windows, and remove all fitting tables and materials from their reception rooms, thus revamping them into rooms similar to the living rooms in their homes. Secondly, optometrists employed in jewelry and department stores should simply quit and rent space in suitable office buildings. Then, too, both newspaper and radio advertising should be banned. Remove optometry from the public gaze and the public ear and you have destroyed the weapon which prevents public recognition.

Now let us evaluate individual reaction to and other results from the changes mentiond. The optometrist in the former store will direct personal letters under first class cover to his patients, advising them of the renovation and the addition of new instrumentation to render better service, at the same time inviting them to call for an adjustment of their glasses and a visual check, without charge. The result and the change in the optometrist will be amazing. No longer will he have to worry about window displays and the transient shopper. Moreover,

his monetary benefits will be increased through rendering of additional and more professional service. He will find himself conducting his practice on an appointment basis which will eliminate having patients drop in just because they find it convenient. I have assumed the optometrist who owned a store has an established practice and thus the change-over will cause no change in income other than an increase thereof.

It is not quite so simple for the employed optometrist. True, in the event that he has been employed over a priod of time he surely has made friends with many patients who will follow him to his new office, but he is faced with the job of getting new patients. How does he accomplish this?

If he has lived in the same neighborhood for some time he has built up an acquaintance with his neighbors, he attends some church, and perhaps belongs to one or more clubs. In this event he should address a personal letter to every person he knows, inviting him to visit his new office and offering to adjust his glasses—if he wears them—and to make a preliminary, survey-type, visual check without charge. He might also inform the recipients of his letter that he has set aside one afternoon or evening each week to care for worthy charity cases. He will immediately enlarge his list of acquaintances by taking an active interest in his church, joining his local service club, getting interested in civic and war activities, arranging for the showing of educational films and the giving of short talks on eye care. He might also contact all clergymen within a reasonable distance from his office, informing them of his desire to care for the visual needs of any indigent persons they recommend, and offer to care for those needing his services in children's and old people's homes. Bear in mind it is not necessary to solicit business. The mere fact that you are doing something for the benefit of others brings its own reward.

For years I have endeavored to put myself "in the other fellow's shoes" in order to see a problem his way. Sometimes I succeed, but even if I do not, I am still better able to discuss it with him. I mention this because of the problem confronting the newly graduated optometrist. He passes his State Board and before he can adjust himself, he has offers from laymen at a wage he probably only dreamed of. So he says to himself, "Well, I sure need the money, why not take this job and when I have enough laid aside, I can open my own office." Little does he realize the spider's web in which he has entangled himself. In a short time he

receives an increase in salary, marries, buys a car, assumes more and more family responsibility, and then is tied to his job.

Frankly, our own profession is at fault here. What has it done to start a young optometrist in his own practice? There has been talk for some years of the establishing of a fund to tide young men over the first lean year or two and of advising them what localities need their services. I have listened to the interesting annual reports on this subject delivered at the AOA meetings of the House of Delegates. The reports are read to a handful of delegates and then filed in the national secretary's office.

The large city draws these young men as a flame attracts a moth. It offers bright lights and amusement but absolutely no hope of establishing a paying practice within any reasonable time. What can they do but accept well-paying jobs offered them by lay corporations?

On the other hand, there are hundreds of small towns crying for the service they can render and offering advantages never attained in cosmopolitan centers. There is a closer cooperation between the physician, dentist and optometrist. Within a short time one becomes well known by the residents of the community. Having an office in the home offers advantages, too, as in small towns many attractive homes are adjacent to the business district.

I am confident the solution of the problem lies within our own ranks and becomes a matter for individual consideration and action on the part of those responsible for optometry's present position.

J. FRED ANDREAE

DISTRICT OF COLUMBIA ELECTS KRASKIN

At the last regular meeting of the District of Columbia Optometric Society held at the Ambassador Hotel in Washington, D. C., the following were elected officers for the ensuing year:

President, Dr. Lewis H. Kraskin; 1st Vice President, Dr. David Dantzic; 2nd Vice President, Dr. George A. Warren; Secretary, Dr. M. Luther Dicus; Treasurer, Dr. Alfred McDonald. Board of Trustees: Drs. John E. Claflin, Joseph S. Wagenheim, Rex B. Sheley, J. Thomas Nelson, and Meyer Ostrower.

Dr. Lewis H. Kraskin, member of the Academy, is also president of the District of Columbia Board of Optometry.

BOOK NOTICES AND REVIEWS

Books received are acknowledged by notices in this department. Special selections will be made for more extensive review in the interest of our readers as space permits.

INDUSTRIAL OPHTHALMOLOGY. Hedwig S. Kuhn, M.D. Published by the C. V. Mosby Company, 3523 Pine Blvd., St. Louis, Mo. 265 illustrations. 294 pages. Cloth. $6.50. 1944.

The author of this monograph has worked with Professor Joseph Tiffin at Purdue in various studies made under his supervision in the field of industrial visual skills. In addition, she is a practicing ophthalmologist. Her comments deal with pre-employment visual tests and surveys in industry. Naturally, perhaps, great emphasis is placed on ocular pathology, an emphasis all out of proportion to the amount of pathology found at any time or out of proportion to the specific value of correcting measures employed when pathology is found.

Several of the chapters are contributed by other writers. Dr. A. C. Snell discusses eye injuries and Roy S. Bonsib reviews the subject of toxic hazards.

The new Bausch & Lomb Ortho-Rater is described, as are various other techniques of more or less value in screening large groups for gross visual errors or imbalances. The book, while considerably padded, nevertheless is one which makes for both interesting and entertaining reading.

In orthodox ophthalmological style the optometrist is entirely ignored, as though he did not exist. In line with some similar ophthalmological reasoning (?) it is suggested that visual tests be made by lay persons because, of course, but few ophthalmologists could be found to do this work.

How can a suggestion of this nature be made seriously by a person who pretends to be concerned with the visual well-being of her fellow citizens? With thousands of well-trained available optometrists at hand in various industrial centers who would be willing to work under the broad and general supervision of an ophthalmologist in this field, it is a strange commentary on professional ethics that permits an ophthalmologist to seriously suggest putting visual tests into the hands of untrained persons solely because the ophthalmologist would rather ignore the technical skill and presence of the optometrist.

Of course Kuhn is by no means the only offender in this regard, but that can be no excuse. Here she merely joins others of her group who

openly stamp themselves more interested in developing ophthalmological prestige than in truly serving the public.

CAREL C. KOCH

ANNOUNCEMENTS

VETERANS REHABILITATION EDUCATIONAL PROGRAM

There are only four requirements for the Veterans of World War II who wish to avail themselves of the education which is being offered by the government. These requirements are:

1. That the person must have been in the active military or naval service any time after December 6, 1941, and during the present war.
2. That he or she must be honorably discharged from active service.
3. That he or she must have a disability incurred in or aggravated by such service for which pension is payable under laws administered by the Veterans Administration, or would be but for the receipt of retirement pay, and
4. That he or she must be in need of vocational rehabilitation to overcome the handicap of such disability.

The purpose of vocational rehabilitation is to restore the employability which has been lost by virtue of a handicap due to a disability incurred in or aggravated by service.

As training facilities to accomplish this purpose recognized and accredited colleges, universities, and other educational institutions are being utilized to provide institutional training and well-established business enterprises to afford training-on-the-job.

The filing of application for pension, V. A. Form 526, will initiate a determination as to the presence or absence of a pensionable disability producing a vocational handicap. If a vocational handicap is present, the veteran will be advised that he or she may make application for vocational training.

The selection of an occupation in which rehabilitation will be effected is based upon consideration of the individual veteran's education, vocational experience, abilities, personal desires, and present disability, and contemplates that the vocational training to be provided will supply the necessary occupational information and develop the

proper skills to afford the disabled person a well rounded knowledge of and the ability to perform all of the skills, job operations, and work tasks which are essential to meeting employment requirements in the chosen occupation.

Maintenance and support during training and for two months after employability has been determined will be provided through increased pension. A single person will receive a pension at the rate of $80.00 a month, a married person $90.00 a month, with $5.00 a month for each dependent child and an additional allotment in the amount of $10.00 a month for each dependent parent.

No course of instruction can exceed four years in length nor shall any training under this legislation be afforded beyond six years after the termination of the present war.

Veterans discharged from the armed services by reason of disability are invited to make application for pension at time of discharge and this record, with other records, will be forwarded to the Veterans Administration field station having jurisdiction of the territory within which the veteran has indicated he or she intends to reside. These records are there examined and eligibility rights established. Veterans who are determined to have pensionable disabilities producing a vocational handicap are advised that they may make application for vocational rehabilitation.

OPTOMETRIC VOCATIONAL GUIDANCE

The Public Health Bureau of the American Optometric Association announces a book in preparation on the subject of optometry. The writing of this book is in the hands of Meta Pennock Newman under the guidance of the outstanding vocational guidance authority of the country, Harry D. Kitson, Ph.D., of Teachers College, Columbia University. This book will be devoted to the aspects of optometry that appeal to prospective students.

In order to obtain the statistics necessary to give the student an overall picture of the profession, a questionnaire has been prepared and is being sent to every third name on the American Optometric Association membership list. *It is not necessary to sign these questionnaires,* but it is very necessary to fill them out as completely as possible and return them in the shortest possible time.

Meta Pennock Newman is a graduate of Barnard College, B.A., has a broad background of training and experience in psychology, statistics,

and vocational studies in the public health field. She was for twenty years editor for the Trained Nurse and Hospital Review, a publication published by the Lakeside Publishing Company and one of the outstanding magazines in the field. She has a medical background in that she was director of the publications of Paul B. Hober and was executive secretary of the New Jersey Civilian Defense Council, Medical Division. She is a Fellow of the American Public Health Association, and at present president of the Association of Women in Public Health.

SOUTHERN COLLEGE OF OPTOMETRY

Beta Chapter of Pi Kappa Rho Sorority of Southern College of Optometry has reorganized with one honorary and eleven active members who signed the State Charter of Incorporation and membership roll on April 21, 1944. Following the formal ritual of initiation, a dinner-dance was held in the Balinese Room of Hotel Claridge in downtown Memphis. Among those attending were Dr. W. R. Cramer, president of Southern College of Optometry, members of the faculty, honord guests, and members of the organization.

The Chapter is now formulating plans for rush activities.

The officers include President Beulah Matthews of Tulsa, Okla, a graduate of Phillips University and formerly a high school instructor in dramatics, an exemplar member of Beta Sigma Phi. Vice President Mary Parker of Little Rock, Ark., formerly attended Southwestern University, member of Delta, Delta, Delta. Secretary Cecelia Brooks of Kansas City, Mo., a former county school instructor and past president of Shawnee Mission Cooperettes International. Treasurer Jane Brent of Laurel, Miss., graduate of Mississippi State College for Women, member of Kappa Delta Phi.

THE AMERICAN OPTOMETRIC LEGION

Following a series of conferences among optometrists stationed at Posts in the environs of San Antonio, Texas, a meeting was held Friday, March 17, to organize the American Optometric Legion.

The constituted purpose of the new organization is to afford optometrists in the Armed Forces organized and vocal representation in all matters both current and postwar.

The new organization is conscious of the desirability of cooperation between it and other organized optometric groups. However, being

dedicated to the present and future interests of optometrists who have served, or will have served in the Armed Forces, The American Optometric Legion is prepared to act independently, aggressively, and promptly—according to the dictates of its membership and circumstances.

Membership is open to all licensed optometrists in the Armed Forces and to those optometrists who have been honorably discharged, provided they have had at least six months' service. Optometric students whose studies have been interrupted by enlistment or induction are eligible as Associate Members, and upon completion of their studies will automatically attain full membership. Optometrists serving in Reserve organizations may attain membership only by special election.

All optometrists and former optometric students who are eligible for membership are urged to send the following information to Dr. E. H. Ridgeway, Executive Secretary, American Optometric Legion, 140 West State Street, Trenton, N. J.:

1. Name, rank and serial number.
2. Name of present unit of organization.
3. Name of present post, camp or station.
4. Present assignment
5. College.
6. Year of graduation or time of cessation of studies.
7. Home address.

The foregoing will constitute enrollment as a member. A post card will suffice, but a brief letter, outlining the individual's ideas on major issues and most immediate needs, is strongly recommended. No dues or assessments will be required of members for the duration.

Pvt. Joseph M. Bugno, as chairman of the Nomination Committee, presented the following slate of officers, all of whom were unanimously elected:

President—T/S Andrew F. Fischer
First Vice President—Pfc. Norman A. Zevin.
Second Vice President—Lt. McKee S. Pfefferle.
Third Vice President—Pvt. Joseph M. Bugno.
Recording Secretary—Pvt. Morris Grossman.
Treasurer—S/S Morris J. Lipschitz.
Executive Secretary—Pfc. Earl H. Ridgeway.

SOUTHERN CALIFORNIA CHAPTER

The following resolution was passed by the Southern California Chapter of the American Academy of Optometry at their regular monthly meeting on May 12, 1944:

WHEREAS, Ray Moore Peckham recently has been called from labor to repose and,

WHEREAS, Dr. Peckham was one of the earliest contributors to the science and literature of optometry, particularly in the field of orthoptics, causing him to sacrifice the comforts of home and family for the discomforts of hotel, railroads and lecture platform, now be it

RESOLVED, that we, the members of the Southern California Chapter of the American Academy of Optometry, hereby record our appreciation of the self-sacrificing efforts of Dr. Peckham, and extend to Mrs. Peckham and the two sons our sincerest sympathy.

WM. M. KETCHUM, Opt.D.
Secretary-Treasurer

OPTOMETRY AND THE ARMED SERVICES

Dr. Ewing Adams,[1] President of the American Optometric Association has announced that the Board of Trustees of the A. O. A. has agreed to draft and submit a Bill to Congress dealing with the subject of commissions for optometrists now serving as refractionists in the army. This long delayed action will prove most welcome to many optometrists both in and out of the armed services.

Dr. A. F. Fischer,[2] President of the American Optometric Legion has announced that his organization of World War II optometrists will support such a Bill and urges all optometrists in both the army and the navy to now join the Optometric Legion to lend their collective support to all measures which will improve the duties and standing of optometrists in the service.

A. O. A. TO MEET IN DETROIT

The 47th annual meeting of the American Optometric Association will be held at the Book-Cadillac Hotel, Detroit, Michigan, June 25, 26, 27 and 28. This will be a war time meeting without exhibits or lectures. It will be attended, in great part, by the state delegates who

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[1]E. Adams. Legislation to Commission Army Optometrists Decided Upon. The Optical Journal and Review of Optometry. LXXXI., No. 10, pp 18-19, 1944.
[2]American Optometric Legion, release of May 16, 1944.

will be in session for the four day period. The newly elected Board of Trustees will hold its first meeting on the 29th and 30th of June.

The 20th annual meeting of Beta Sigma Kappa will be held at noon Tuesday, June 27, in the English Room of the Book-Cadillac Hotel. The Mu Chapter will sponsor this meeting.

B. V. I. CALLS ANNUAL MEETING

The annual meeting of the Better Vision Institute has been called for Friday, July 7th, 1944. The meeting place is the Petit Salon of the Park Lane Hotel, 299 Park Avenue, New York City. All members of the Institute are eligible, and are invited to attend this meeting. New Directors are to be elected. Also, changes in the By-laws to provide for the election of Ophthalmologist members to the Institute Board, are to be voted upon. Likewise, the subject of professionalizing all of the terminology in the Institute By-laws is to be discussed, along with other important matters which may be presented at the meeting.

NEW CORPORATION SEEKS IDEAS AND OFFERS WAR BOND PRIZES

A group of men, well known in optical circles, has organized the Optical Specialties Corporation for the purpose of introducing, through established channels, new products and services which will contribute to professional and scientific progress. Realizing that the merit of its service will be measured by its value to optometrical advancement, the Optical Specialties Corporation announces that it will institute a prize contest to bring to light ideas for products needed in the professions and industry. This contest will be open to all connected with the field of ophthalmic optics with awards to be made in the form of War Bonds.

The Optical Specialties Corporation has no connection with any other optical company. However, among its officers and directors are men whose names are familiar to all optometrists. The President, Leopold Strauss, was for many years an owner and managing director of the Optical Products Corporation. Frederick L. Slosson, Executive Vice President, has been active in the optical industry for more than 25 years and has been associated with the Shuron Optical Company and the Soft-Lite Lens Company. David Jassy, formerly comptroller of the Optical Products Corporation is the Secretary.

The Chairman of the Board of Directors is Nathaniel Singer, who will serve the new Corporation in an advisory capacity and bring to it the benefit of his many years of experience as President of the Optical

Service Corporation and the Soft-Lite Lens Company. Other Directors include Mr. Strauss, Mr. Slosson, Mr. Jack Sloane, Attorney, and Mr. George Field, well known in the field of Public Relations.

In describing the functions of the company, Fred Slosson stated, "It is to be the policy of the Corporation to undertake the introduction of a new product only after consultation with men of recognized standing in the various optical divisions likely to be interested in that particular product or service. We believe that their advice should be sought and followed as to the desirability and need for the product and as to the methods of sales and distribution."

The Optical Specialties Corporation will later introduce a diversified line of products and service. It welcomes product suggestions, either as recommendations from the professions as to products or services they need and which the Corporation might develop and supply, or as products suggested by the inventor which are suitable for use in the professions or industry.

To encourage the development of product and service ideas which will be of benefit to optometrists, the Optical Specialties is evolving a plan of offering prizes, in the form of War Bonds, for all acceptable ideas. In addition to the initial prize, royalty arrangements will be made with the inventors and devisors of those products introduced by the Corporation. In all cases, the interests of employers of persons whose ideas are accepted will be included in the consideration. Complete details of the contest will be announced soon and until that announcement is made no entries will be accepted. Inquiries may be addressel to the Optical Specialties Corporation, 119 West 57th Street, 19, New York.

U. S. SUPREME COURT RULES ON SOFT-LITE DISTRIBUTION PRACTICES

This journal has had inquiries from optometrists who have seen the recent publicity given to the decision of the United States Supreme Court in the action brought by the Government against Bausch & Lomb Optical Company, and Soft-Lite Lens Company, Inc. To clarify the decision, we present the following information.

The case was first tried in the United States District Court. The decision of that Court came down in May, 1942, holding, in effect that the Soft-Lite Lens Company were solely responsible for the licensing and distribution system of Soft-Lite and that the Bausch & Lomb Optical Company did not participate therein, and that, accordingly, there was

no conspiracy between the two companies. This resulted in a dismissal of the complaint against Bausch & Lomb. It was also decided, contrary to the Government's contention, that the contract between the Soft-Lite Lens Company and Bausch & Lomb for exclusive manufacture of Soft-Lite lenses was legal and valid. With respect to the licensing and distribution system, Soft-Lite was directed by the decree to make certain changes which will later be referred to in detail. The decision of the District Court was acceptable to Soft-Lite and that corporation indicated that it would not appeal, if the Government took no appeal. However, the Government appealed the case and Soft-Lite then took a cross-appeal.

In the appeal to the United States Supreme Court, the Attorney General sought to have the lower court's decision enlarged in the following respects:

A. The Government sought to require the Soft-Lite Lens Company to "sell its product, without discrimination, to any person offering to pay cash therefor." This was denied.

B. The Government sought a permanent injunction against execution of "fair trade" resale price maintenance contracts. This was denied.

C. The Government claimed that Bausch & Lomb's agreement not to sell pink-tinted glass or lenses to any manufacturer or distributor other than Soft-Lite, and not to market itself any pink-tinted lenses, unreasonably restrains competition and is, therefore, illegal. This was denied.

D. The Government sought an injunction which would not only forbid the carrying out of the Bausch & Lomb Soft-Lite exclusive manufacturing agreement, but which would, in addition, require Bausch & Lomb to file with the District Court "a written instrument providing that, so long as it continues to sell such glass or lenses, it will sell the same, without discrimination, to any person offering to pay cash therefor." This was denied.

The lower court's judgment directing the discontinuance by Soft-Lite of its license system was affirmed. The following is an extract from the opinion of the United States Supreme Court delivered April 10, 1944:

" . . . The Federal Courts have jurisdiction of suits to enjoin violations. Congress has been liberal in enacting remedies to enforce the anti-monopoly statutes. But in no instance has it indicated an intention to interfere with ordinary commercial practices. In a business, such as Soft-Lite, which deals in a specialty of a luxury or near-luxury character, the right to select its customers may well be the most essential factor in the maintenance of the highest standards of service. We are, as the District Court apparently was, loath to deny to Soft-Lite this privilege of selection . . . "

A summary of the provisions of the judgment entered by the District Court, affirmed by the Supreme Court, with respect to the license and distribution system of Soft-Lite Lens Company, Inc., is as follows:

A. It requires Soft-Lite to cancel its optometrist and optician licenses and its "fair trade" resale price maintenance contracts. Fair trade contracts may be "renegotiated after six months from the notice of cancellation which the judgment directs to issue."

B. It enjoins Soft-Lite from making any agreement which fixes the prices or otherwise relates to the dispensing of materials not purchased from Soft-Lite.

C. It enjoins Soft-Lite from carrying out any present agreement or making any new agreement with a wholesaler which provides that the latter sell only to designated persons or which fixes the prices at which the wholesaler shall sell to prescription dispensors.

D. It enjoins Soft-Lite from using any device permitting the tracing of lenses after the first sale.

E. The judgment also enjoins Soft-Lite, for a six months' period, from "systematically suggesting" to any person, wholesale, prescription, or consumer prices on Soft-Lite lenses and from renegotiating "fair trade" resale price maintenance contracts.

PUBLISHER'S NOTICE—Because of the shortage of paper, the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY will discontinue the sale of space for all optometric college or school advertisements until further notice. Advertising agreements and contracts for optometric college or school advertising now in force will continue until their expiration, but will not be extended beyond the present expiration date of said contract or agreement.

Effective June 1, 1944.

CAREL C. KOCH

ABSTRACTS

A department in which will appear abstracts of the literature of optometry, ophthalmology and applied optics. These will be classified according to the following list although contributions to all sections will not necessarily appear in each issue.

1. Ocular Refraction.
2. Physiological Optics and Color Vision.
3. Ocular Muscles.
4. Orthoptics and Reading.
5. Anatomy, Histology and Embryology.
6. Ocular and General Pathology.
7. Ophthalmic Lenses and Material.
8. Instruments.
9. Hygiene and Illumination.
10. Applied and Physical Optics.
11. Education, Sociology and Economics.
12. Miscellaneous.

11. EDUCATION, SOCIOLOGY AND ECONOMICS

THE OPHTHALMOLOGIST AND THE PARTIALLY SEEING CHILD. W. Hathaway. Sight-Saving Review. 1942, 12, 3, 196-200.

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About one-half of the space is devoted to technical articles, and the remaining half is given over to special departments, editorials, abstracts and book reviews, in large part original.

The papers and reports are original and are accepted only with the understanding that they are to be published in this journal exclusively.

The editors of the American Journal of Optometry and Archives of American Academy of Optometry beg to offer the following suggestions to authors who propose to favor them with the publication of their contributions:

I. Write on one side of the paper. Double-spaced, typewritten MS. is preferred.

II. Words to be printed in *italics* should be underscored once, in SMALL CAPS twice, and in LARGE CAPITALS three times. Antique type when called for should be so marked.

III. Be sure that the title of your paper indicates its contents. Should the subject be a general one, for instance, Case Reports, it would be well to mention the subject of each special report—for instance: Case One. Progressive Myopia with Exophoria. Case 2. Divergent Squint with Amblyopia. These special titles will appear in the table of contents of each number.

IV. Illustrations should be carefully drawn with India Ink on separate sheets.

V. When authors receive proofs for revision, they should correct and return these without delay. We beg, however, to remind our contributors that changes in the manuscript necessitates resetting, this causing much additional expense, so we ask that alterations be limited to what is of essential importance.

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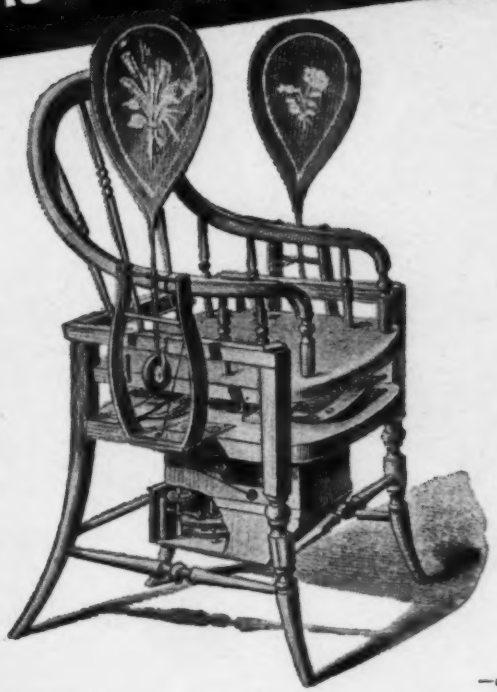

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This "air-conditioned" chair was designed to keep the sitter cool without forcing him to the exertion of wielding a fan by hand. Operated by the pressure of the sitter's weight, the seat moves slowly down from its spring-elevated position causing the fans to rotate. Declared to produce 1,257 strokes of the fans in "one sitting", this chair, patented in 1878, never gained acceptance because it was expensive, unwieldy and did not fill a real need.

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